

Master thesis

Viscou-thermal acoustics on moving domains

Motivation:

Due to the requirements of headphones to get more compact and efficient, the demand for highly integrated Micro-Electro-Mechanical Systems (MEMS) speaker solutions is on the rise. The high integration and small scales (sub micro-meter range) poses the requirement to include viscous and possibly thermal effects for the sound propagation. Furthermore, the sound generation principles investigated at our institute require a formulation for moving domains in order to resolve e.g. the shutter movement. Therefore, the already existing Arbitrary-Lagrangian-Eulerian (ALE)-framwork for viscous acoustics of our inhouse FEM solver openCFS should be extended to also include thermal effects. The goal of this thesis is to derive the formulation, implement and test it in openCFS.

Tasks:

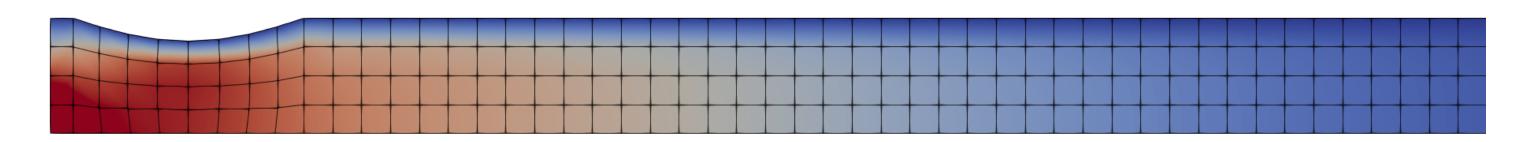
- Derive and verify an ALE formulation for thermoviscous acoustics
- Implement the missing coupling and ALE-related terms in *openCFS* (programming language is C++)
- Test the formulation

Organization:

Start at any time

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fluidMechVelocity Magnitude 0.01 0.015 0.02 0.025 0.03 0.035 0.04 4.5e-02 0.0e + 000.005

